

Laboratory test

Degradation of residual PAH in pre-cleaned soil



Company Headquarters

Man Oil Group AG
Gotthardstr. 3
6300 Zug | Switzerland
+41 41 726 30 99
info@mog-green.tech

Berlin Office

Regus Business Center
Kurfürstendamm 21
10719 Berlin | Deutschland

Ukraine Office

Business Center Telesens
Akademika Proskury Str. 1
61070 Kharkiv | Ukraine

President of the Board: Günther Villing **Registered Office:** Gotthardstr. 3 | 6300 Zug | Schweiz

Bank Details: IBAN CH57 0900 0000 9143 8290 9 BIC POFICHBEXXX

mog-green.tech

Laboratory test—reduction of residual PAH

Project-ID	2017-004-PAH-S
Location	Berlin
Client	Internal
Objective	Proof of efficacy for treating residual pollution in pre-cleaned soil with superoxidation method NHS ⁺
Involved Parties	gbav Gesellschaft für Boden- und Abfallverwertung mbH Berlin, Labor WESSLING Berlin

Project Description

The gbav provided MOG a soil sample still contaminated with polycyclic aromatic hydrocarbons (PAH) after a physical-chemical soil washing process.

Course of action

Around 3 kg of the pretreated, pre-cleaned, mainly sandy-silty soil were provided for the experiment. The PAH contamination was about 10 mg/kg in dry matter (DM). The organic pollutants were low with a TOC of <0.5%. 300 g of the sample were treated with NHS⁺ in the laboratory, the PAH content was calculated after the requirements of the U.S. Environmental Protection Agency (EPA). For comparison the original sample was also analysed.

Results

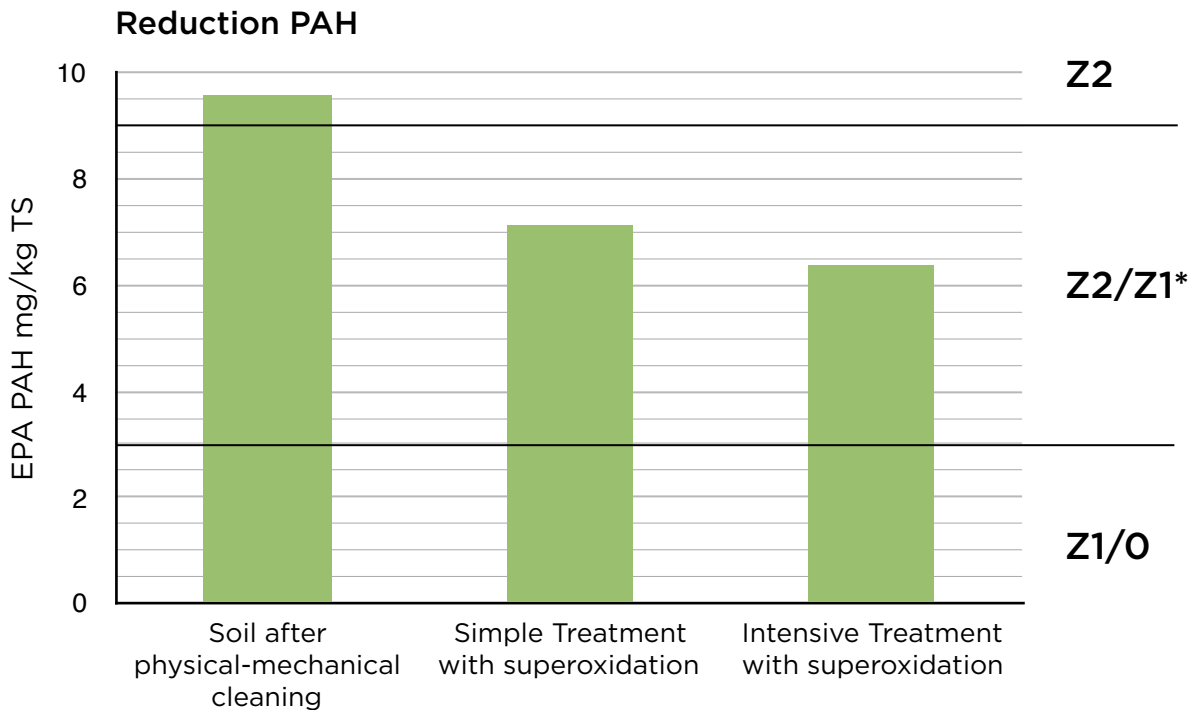
	Pre-cleaned soil	After treatment with NHS ⁺ (low)		After treatment with NHS ⁺ (high)	
	mg/kg (DM)	mg/kg (DM)	Reduction (%)	mg/kg TS	Reduction (%)
Benzo(a)pyren	0,85	0,53	37,6	0,43	49,4
Sum EPA-PAK	9,56	7,10	25,7	6,38	33,3

Summary

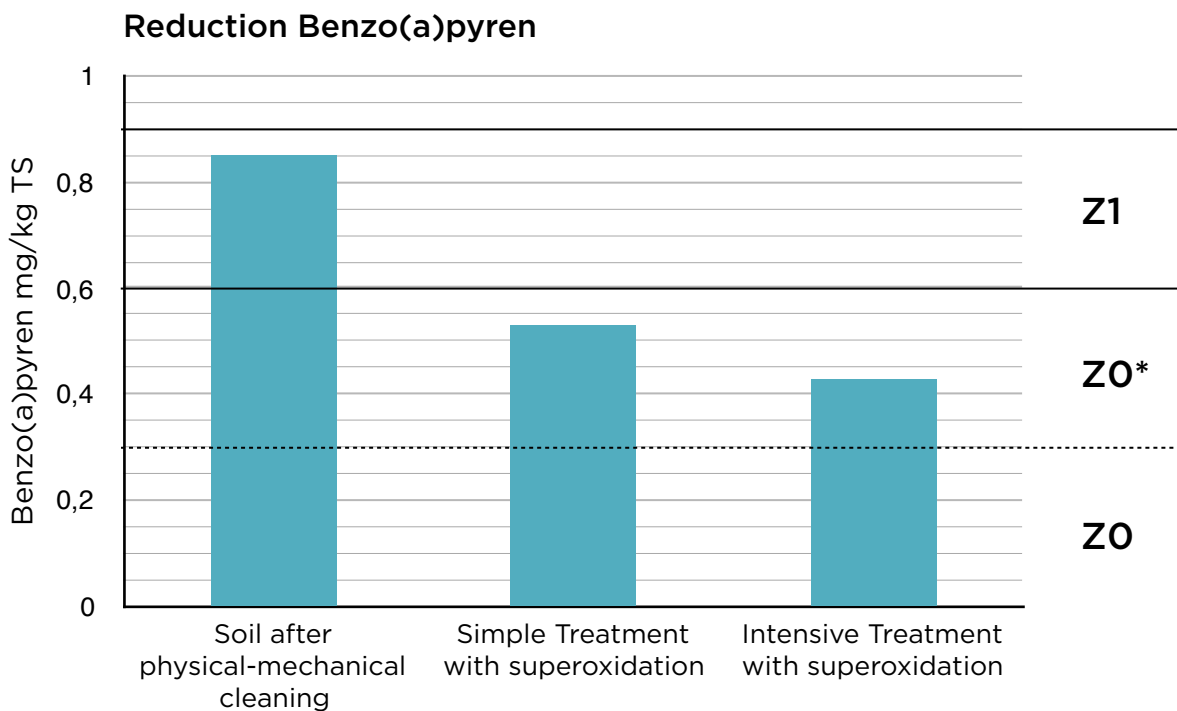
The treatment resulted in a further reduction of PAH components of 20-50%. According to the requirements of German guideline LAGA M20 (2013), depending on the use of the soil, a reduction of the reinstallation-class from Z2 to Z1 (total sum of EPA-PAH) resp. Z1 to Z0 for Benzo(a)pyrene was achieved. An increase of the NHS⁺ volume did not lead to a considerable improvement of the treatment.

Attachments	<ul style="list-style-type: none"> - Diagrams of the reduction results - Excerpt of the laboratory report from WESSLING
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Graphic illustration of the laboratory results



* Soil material with classification values >3 mg/kg and ≤ 9 mg/kg can only be reinstalled in areas with mit hydro-geologically favorable upper soil layers.



* Classification value for soil material that can be used for the backfilling of excavations below the rooted soil layer.

Prüfbericht Nr. **CBE17-005266-1** Auftrag Nr. **CBE-02123-17** Datum **05.04.2017**
Polycyclische aromatische Kohlenwasserstoffe (PAK)

Probe Nr.			17-050811-01	17-050811-02	17-050811-03
Bezeichnung			GBAV 001 - Erde	GBAV 002 - (Erde halb flüssig)	GBAV 003 - (Erde halb flüssig)
Naphthalin	mg/kg	TS	0,10	<0,06	0,11
Acenaphthylen	mg/kg	TS	<0,06	<0,06	<0,06
Acenaphthen	mg/kg	TS	0,09	0,10	<0,06
Fluoren	mg/kg	TS	0,11	0,09	0,11
Phenanthren	mg/kg	TS	1,2	1,1	1,1
Anthracen	mg/kg	TS	0,21	0,18	0,17
Fluoranthen	mg/kg	TS	2,1	1,6	1,4
Pyren	mg/kg	TS	1,6	1,2	0,96
Benzo(a)anthracen	mg/kg	TS	0,53	0,39	0,34
Chrysen	mg/kg	TS	0,73	0,55	0,5
Benzo(b)fluoranthen	mg/kg	TS	0,54	0,37	0,34
Benzo(k)fluoranthen	mg/kg	TS	0,37	0,25	0,24
Benzo(a)pyren	mg/kg	TS	0,85	0,53	0,43
Dibenz(ah)anthracen	mg/kg	TS	<0,06	<0,06	<0,06
Benzo(ghi)perylene	mg/kg	TS	0,59	0,38	0,35
Indeno(1,2,3-cd)pyren	mg/kg	TS	0,54	0,31	0,33
Summe nachgewiesener PAK	mg/kg	TS	9,56	7,10	6,38

Abkürzungen und Methoden

Trockenrückstand / Wassergehalt im Feststoff

DIN ISO 11465^A

Polycyclische aromatische Kohlenwasserstoffe (PAK)

DIN 38414 S23^A

OS

Originalsubstanz

TS

Trockensubstanz

ausführender Standort

Umweltanalytik Oppin

Umweltanalytik Oppin

Dieses Dokument wurde elektronisch erstellt und ist auch ohne Unterschrift gültig.